

WHAT IS CLAIMED

1. A device for determining the position and/or orientation of a creature (3) relative to an environment, said device comprising a locating member (4) connected to the creature, said locating member including a transducer (5) arranged to determine its position and/or orientation relative to the environment by receiving incident signals from at least three signal sources (9) in the environment, three of which have known positions relative to the environment, and by recording the relative incident directions of the signals received in relation to the transducer, and a means (8) by which a body part of the creature and the transducer are connected to each other so that the relative positions and/or orientations of the body part and the transducer are arranged to be within a limited interval, for determining the position and/or orientation of said body part of the creature by means of the information about the position and/or orientation of the transducer, **characterized in** that the transducer is provided with at least one phased-array for receiving said signals and recording the relative incident directions of the signals.
- 25 2. A device according to claim 1, **characterized in** that said signals are constituted by microwaves.
3. A device according to claim 1, **characterized in** that said signals are constituted by acoustic waves.
- 30 4. A device for determining the position and/or orientation of a creature (3) relative to an environment, said device comprising a locating member (4) connected to the creature, said locating member including a transducer (5)

arranged to determine its position and/or orientation relative to the environment by receiving incident optical signals from at least three signal sources (9) in the environment, three of which have known positions relative to the environment, and a means (8) by which a body part of the creature and the transducer are connected so that the relative positions and/or orientations of the body part and the transducer are arranged to be within a limited interval, for determining the position and/or orientation of said body part of the creature by means of the information about the position and/or orientation of the transducer, **characterized in** that the transducer (5) has a surface designed to receive signals transmitted from the signal sources (9) and record the relative incident positions of the received signals on the surface, and in that the device includes at least one reference defined by the introduction of at least one condition regarding the position and/or orientation of the transducer (5) relative to the environment for creating an abstract station.

5. A device for determining the position and/or orientation of a creature (3) relative to an environment, said device comprising a locating member (4) connected to the creature, said locating member including a transducer (5) arranged to determine its position and/or orientation relative to the environment by receiving incident optical signals from at least three signal sources (9) in the environment, three of which have known positions relative to the environment, and a means (8) by which a body part of the creature and the transducer are connected so that the relative positions and/or orientations of the body part and the transducer are arranged to be within a limited interval, for determining the position and/or

orientation of said body part of the creature by means of the information about the position and/or orientation of the transducer, **characterized in** that the transducer (5) has a surface designed to receive signals transmitted from the signal sources (9) and record the relative incident positions of the received signals on the surface, and in that the locating member (4) includes a sensor for obtaining information from the environment by recording or measuring one or more properties of the environment in one or more positions and/or directions.

6. A device according to claim 1, **characterized in** that the transducer (5) is arranged to repeatedly determine its position and/or orientation relative to the environment when the transducer and the environment are moved relative to each other.

7. A device according to claim 1, **characterized in** that the transducer (5) is arranged to be freely moveable and mechanically unguided by the environment in an arbitrary co-ordinate system when the transducer and the environment are moved relative to each other.

8. A device according to claim 1, **characterized in** that the transducer (5) is designed with a signal receiving direction area, that constitutes a solid angle exceeding 0,2 steradians (SR), and which is formed by the collected amount of signal receiving directions in which the transducer is arranged to receive incident signals from said signal sources (9).

9. A device according to claim 8, **characterized in** that the signal receiving direction area of the transducer (5) constitutes a solid angle that exceeds 1 steradian.

10. A device according to claim 8, **characterized in** that the signal receiving direction area of the transducer (5) constitutes a solid angle that exceeds 2 steradians.
- 5 11. A device according to claim 8, **characterized in** that the signal receiving direction area of the transducer (5) constitutes a solid angle that exceeds 4 steradians.
- 10 12. A device according to claim 8, characterized in that the signal receiving direction area of the transducer (5) is topologically connected.
- 15 13. A device according to claim 1, **characterized in** that the transducer (5) is arranged to determine its position and/or orientation with respect to at least two degrees of freedom relative to the environment.
- 20 14. A device according to claim 13, **characterized in** that the transducer (5) is arranged to determine its position and/or orientation with respect to at least three degrees of freedom relative to the environment.
- 25 15. A device according to claim 14, **characterized in** that the transducer (5) is arranged to determine its position and/or orientation with respect to at least four degrees of freedom relative to the environment.
- 30 16. A device according to claim 1, **characterized in** that the locating member (4) comprises a means (6, 15) for transferring information to the creature (3).
17. A device according to claim 1, **characterized in** that the locating member (4) includes a pointing component (23)

portable by the creature (3) and mechanically connected to the transducer (5) to be directed relative to phenomena (22) in the environment.

- 5 18. A device according to claim 17, **characterized in** that the pointing component (23) comprises a means (25) for transmitting directive electromagnetic radiation.
- 10 19. A device according to claim 1, **characterized in** that the locating member (4) comprises a means (7, 15) for receiving information from the creature (3).
- 15 20. A device according to claim 1, **characterized in** that it includes a means (10) for communication between the locating member (4) and a unit in the environment.
- 20 21. A device according to claim 1, **characterized in** that it includes at least one reference defined by the introduction of at least one condition regarding the position and/or orientation of the transducer (5) relative to the environment.
- 25 22. A device according to claim 4, **characterized in** that said at least one condition is related to the location and/or extension of an object (21, 30) occurring in the environment so that the locating member (4) has to be put into mechanical contact with the object to fulfil said at least one condition.
- 30 23. A device according to claim 22, **characterized in** that the locating member (4) and/or the object (21, 30) is designed to enable the locating member and the object to engage each other for fixing the locating member or a part thereof, and thereby the transducer (5), relative to

the object so that the transducer fulfils said at least one condition.

24. A device according to claim 20, **characterized in** that the communication means (10) is arranged to establish a connection for transferring signals between the locating member (4) and said object.
25. A device according to claim 1, **characterized in** that the locating member (4) includes a sensor for obtaining information from the environment by recording or measuring one or more properties of the environment in one or more positions and/or directions.
26. A device according to claim 17, **characterized in** that the sensor is included in the pointing component (23).
27. A device according to claim 4, **characterized in** that the transducer (5) is designed to receive signals transmitted from the signal sources (9) and record the relative incident directions of the signals received in relation to the transducer.
28. A device according to claim 27, **characterized in** that the transducer (5) has a surface designed to receive signals transmitted from the signal sources (9) and record the relative incident directions of the signals received in relation to the surface.
29. A device according to claim 1, **characterized in** that the transducer (5) is arranged to receive the signals, rectilinearly propagating between the signal sources and the transducer, from the signal sources (9) which are

constituted by at least three different signal sources in the environment.

30. A device according to claim 1, **characteriz d in** that it includes the signal sources (9) arranged in the environment.

31. A device according to claim 1, **characterized in** that the signal sources (9) are constituted by active signal emitting signal sources.

32. A device according to claim 1, **characterized in** that the signal sources (9) are constituted by passive members reflecting signals that are incident to said members.

33. A device according to claim 32, **characterized in** that it includes means for transmitting signals and that the signal sources (9) are constituted by said passive members reflecting the signals transmitted from the signal transmitting means.

34. A device according to claim 1, **characterized in** that the transducer (5) is arranged to determine its position and/or orientation relative to the environment by receiving incident optical signals from the signal sources (9) in the environment.

35. Use of a device according to claim 1 for determining a movement of a creature (3).

36. Use of a device according to claim 1 for directing a movement of a creature (3).

37. Use of a device according to claim 1 for teaching a creature (3) to perform a certain motion.
38. Use of a device according to claim 1 for teaching the
5 creature (3) to follow a certain path (16) of movement.
39. Use of a device according to claim 1 for determining the presence of an object (2, 3, 19, 30) in an environment.
- 10 40. Use of a device according to claim 1 for giving authorisation to a creature (3).
41. Use according to claim 40 for giving authorisation to a creature (3) to be in a certain position and/or
15 orientation.
42. Use according to claim 40 for giving authorisation to a creature (3) to perform a certain action.
- 20 43. Use of a device according to claim 1 for warning and/or preventing a creature (3) to visit a certain area (17).
44. Use of a device according to claim 1 for determining if
25 an action has been performed.